SCIENCE

A WEEKLY JOURNAL DEVOTED TO THE ADVANCEMENT OF SCIENCE, PUBLISHING THE OFFICIAL NOTICES AND PROCEEDINGS OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

FRIDAY, NOVEMBER 20, 1903.

CONTENTS:

MSS. intended for publication and books, etc., intended for review should be sent to the responsible editor, Professor J. McKeen Cattell, Garrison-on-Hudson, N. .

*THE MISUSE OF PHYSICS BY BIOLOGISTS AND ENGINEERS.**

THIS somewhat informal paper is preliminary to a paper which I have in preparation on statistical physics. My chief object in presenting this preliminary paper is to call attention to some of the precise notions of thermodynamics and to point out the essential limitations of that subject. Gibbs, for example, raises the question repeatedly in his writings as to the legitimacy of the thermodynamic discussion of things, such as thermoelectricity, which are associated necessarily with irreversible processes. What I have in mind concerning thermodynamics proper and concerning statistical physics is a general point of view which completely elucidates this question of Gibbs, setting precise limits not only to systematic thermodynamics, but to systematic physics in the broadest sense, and marking sharp boundaries between systematic physics and what we may call statistical physics.

A great deal is, I think, to be gained for science at the present time by insisting upon the sharp delimitation of those general ideas in physics which are related primarily to thermodynamics just as a great deal has been gained in the last half century by the sharp delimitation of those general ideas which relate primarily to

* A paper read before the American Physical Society on October 31, 1903.

The chapters on the plain and concave gratings, considering the space given to other parts of the subject, might have been fuller. The next six chapters contain theory and experiments on polarized light, the rotation of the plane of polarization, the laws of reflection from transparent and metallic surfaces and the spectrophotometer.

Two statements seem to be misleading. On page 90 it is stated that 'the slit in a spectrometer is made infinitely narrow by placing it at an infinite distance by means of a lens.' The meaning, of course, is that the divergence of the rays falling on the prism from one point of the slit is made very small by placing it at the focus of a lens. The angular width of the slit is finite, being equal to the width of the slit divided by the focal length of the lens. Again on page 159 it is stated that 'Ordinary photometers * * * may be used to compare the intensities of the total radiations of two sources.' Authors of texts can not be too careful to point out that the luminous part of the radiations are but a small part of the total energy sent out by a source. Indeed, it is to be regretted that the subject of optics is generally viewed in this limited light, that no mention is made of the instruments, bolometers, radiometers, thermoelements, etc., used in measuring the total energy of sources, and no notice taken of the interesting properties of bodies with regard to radiations other than luminous.

These general criticisms have no large value concerning the special purpose for which the book was prepared. As a manual of advanced optics it is admirable.

G. F. Hull.
Dartmouth College.

SCIENTIFIC JOURNALS AND ARTICLES.

The October number of *The American Journal of Anatomy* contains the following articles:

Joseph Marshall Flint: 'The Angiology, Angeogenesis, and Organogenesis of the Submaxillary Gland.'

Richard Mills Pearce: 'The Development of the Islands of Langerhans in the Human Embryo.'

Robert W. Lovett: 'A Contribution to the Study of the Mechanics of the Spine.'

J. Playfair McMurrich: 'The Phylogeny of the Palmar Musculature.'

Bird-Lore for September–October contains articles on 'The Mystery of the Black-billed Cuckoo,' by Gerald H. Thayer, showing that it is a bird of nocturnal habits; on 'A North Dakota Slough,' by A. C. Bent; 'A Tragedy in Nature,' by William Brewster; 'Nesting Habits of Two Flycatchers at Lake Tahoe,' by Anna Head, and on 'How Birds Molt,' by Jonathan Dwight, Jr., one of the best authorities on this much-mooted subject. There is the sixth series of portraits of *Bird-Lore's* advisory councilors and numerous notes, including an interesting article on 'Mortality among Birds in June,' besides book reviews and the reports of the Audubon Societies.

The *Museums Journal* of Great Britain for September contains the address of the president of the Museums Association, F. A. Bather, delivered at the Aberdeen meeting of the association and devoted mainly to the subject of the better arrangement of art museums. A plea is made for smaller exhibition halls and the display of a comparatively small number of objects amid harmonious surroundings. Among the notes is announced the coming extension of the British Museum (the older building) at a cost of £200,000, and the coming publication of the first volume of a catalogue of the books, manuscripts and maps in the possession of the British Museum, of natural history.

SOCIETIES AND ACADEMIES.

AMERICAN PHYSICAL SOCIETY.

The fall meeting of the Physical Society was held at Columbia University on Saturday, October 31. The meeting was well attended and was marked by discussions considerably more extended than have recently been usual at Physical Society meetings. These discussions add so greatly to the interest of such gatherings that the further development of this feature of the meetings is much to be desired.

It was decided to hold the next meeting of the Physical Society in St. Louis during convocation week in connection with the Amer-